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ABSTRACTS
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(Pages refer to the Japanese originals of this volume unless otherwise noted.)

On Some Properties of Aldol and the Construction of *p*-Aldol.

(pp. 1∼5)

By M. Hori.

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Received December 14, 1940.)

The author studied some properties of aldol and *p*-aldol, with the results with may be summarized as follows:

1. At room temperature aldol is a comparatively fluid substance. In existing records aldol is described as viscous liquid but the author thinks perhaps this is due to the observations on partly polymerized (to *p*-aldol) aldol.

2. Because aldol is so easy to polymerize it is hard to determine the true value of specific gravity and refractive index. The author proposes the following as approximate values:

$$D_4^{15}=1.0182 \qquad n_D^{15}=1.4292$$

3. Aldol combines with sodium bisulphite in acid medium and separates in alkaline as other aldehydes do.

4. Probably *p*-aldol has the following molecular construction:

$$\begin{array}{l}\mathrm{HO\cdot \overset{}{C}H\cdot CH_2\cdot \overset{}{C}H\cdot CH_3}\\ \quad\;\;|\qquad\qquad\;\;\;|\\ \quad\;\;\mathrm{O}\qquad\qquad\;\mathrm{O}\\ \quad\;\;|\qquad\qquad\;\;\;|\\ \mathrm{CH_3\cdot CH\cdot CH_2\cdot CH\cdot OH}\end{array}$$

Study of the Insecticidal Principle in the Smoke Produced by Combusting Insect Powder. (Part III.)

(pp. 6～10)

By Makoto NAGASE.

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Received December 13, 1940.)

In this report I have studied on the acidic and carbonyl substances in the smoke from pyrethrum. The experimental results were summarised as follows.

Acidic substances :—

54 g of acidic substances obtained from the smoke of 20 kg pyrethrum was distilled under 50 mm pressure into the following three fractions.

Fraction No.	(1)	(2)	(3)
Boiling point	up to 92°	93°	104°～108°
Yield (g)	6.0	5.5	4.5

Fraction (1) gave butyric acid *p*-iodophenacyl ester melting at 79°～80°.

Fraction (2) gave *p*-iodophenacyl ester melting at 78°～79°, and was identified as iso-valerianic acid.

Fraction (3) contained an unknown acid, making the *p*-iodophenacyl ester melting at 86°.

Carbonyl substances :—

At the concentration of the original neutral substances, aldehydes were partly distilled with ether. From this etherial distillate, acet- and propionic aldehyde were obtained as 2,4-dinitrophenylhydrazones.

From the concentrated neutral substances the residual carbonyl substances were separated by sodium bisulphite. These carbonyl substances, amounting to 30 g from 20 kg of pyrethrum, were distilled by passing carbon dioxyde gas under 740 mm pressure into two fractions, up to 68° and 75°～76°. By making 2,4-dinitrophenylhydrazone, the former was decided as butyric and iso-valerianic aldehyde and the latter as iso-valerianic aldehyde.

Sterilizing Action of Acids and Phenols.

15th Report. Summaries and Conclusion on the Sterilizing Action of Phenols and Aromatic Acids.

(pp. 11～18)

By Sogo TETSUMOTO.

(Government Institute for Infectious Diseases, Tokyo Imperial University;
Received November 7, 1940.)

(1) Generally phenols and aromatic acids have a sterilizing or preventing action on the bacteria. The cause of this action is based on undissociated mole-

cules and association of pH and undissociated molecules of each reagent. But a very few reagents such as guajacol, resorcin, phloroglucin and tele phthalic acid have the promoting action for the bacteria.

(2) Phenols and aromatic acids have the tendency of reciprocal proportion between the strength of sterilizing action and numerical value of pH of each reagent like many mineral and fatty acids.

(3) Salts of aromatic acids and phenols have no sterilizing action except salts of tymol, hydroquinon, halogen phenols and NO_2 phenols, salicylic acid, gallic acid and tannic acid.

(4) We find a special relation between the chemical constitution of phenols and aromatic acids and the strength of the sterilizing action or the promoting action on the bacteria. But we could find very few common phenomena in all cases except the action of *p* isomers. Generally *p* isomers have the strongest sterilizing or preventing action on the bacterial life. The order of the strength of the sterilizing action is as follows :

1. Among cresols and di and tri OH phenols :— $m<o<p$.
   Among halogen phenols and NO_2 phenols :— $o<m<p$.
2. Among OH substituted benzoic acid isomers :— $m<p<o$.
3. Among phthalic acid isomers :— tele < iso < normal.
4. *m* isomers of di or tri OH phenols such as resorcin and phloroglucin have absolutely no sterilizing action or preventing action and have an evidently promoting action on the bacteria.

(5) The cause of difference between the chemical constitution of these reagents and the sterilizing or promoting action on the bacteria is as follows :— Each reagent has a different adsorption or consumption in the bacterial protoplasma respectively. These different rates of adsorption or consumption in the bacterial protoplasma causes the different degrees of sterilizing action or promoting action on the bacteria.

(6) *m* isomers such as resorcin and phloroglucin have no sterilizing action and have an evidently strong promoting action on the bacterial life. The cause of this is as follows :—*m*-isomers are used as the nutrients for bacteria.

(7) We find an adequate relation between the strength of the sterilizing action and numerical number of CO_2H group. In aromatic acid groups we find that there is a reciprocal proportion between the number of CO_2H group and the strength of the sterilizing action.

Studies on the Acid Fermentation by Rhizopus Species. (Part I.)

(pp. 19～22)

By K. Sakaguchi, T. Asai and H. Munekata.

(Agricultural Chemical Laboratory, Tokyo Imperial University;
Received December 21, 1940.)

In 1925 Takahashi and Sakaguchi[1] concluded that the 17 species of *Rhizopus* they investigated could be divided into three groups according to the nature of the acids formed from glucose; the first group forming fumaric acid mainly and none or a trace of lactic acid, the second chiefly lactic acid and none or a trace of fumaric acid, and the third forming both fumaric and lactic acids in varied proportions. As for the mechanism of the acid formation, Takahashi and Asai (1927)[2] first demonstrated the production of fumaric acid from acetic acid by *Rhizopus* G 34, which belongs to the first group or the fumaric acid former.

In the present work the authors have found that *Rhizopus* G 36, which belongs to the second group or the lactic acid former, contrary to expectation, produced remarkable quantities of fumaric acid instead of lactic acid in the medium containing ethyl alcohol or acetic acid as the sole source of carbon. From the results obtained it is obvious that if C_2-compounds are used as the carbon sources even the lactic acid former shows the ability of forming fumaric acid. The following scheme, therefore, can be assumed for the acid production by *Rhizopus* species:

$$C_6H_{12}O_6 \left\{ \begin{array}{l} \longrightarrow C_3\text{-compound} \longrightarrow CH_3 \cdot CHOH \cdot COOH \\ \longrightarrow C_2\text{-compound} \longrightarrow \begin{array}{l} CH \cdot COOH \\ \| \\ CH \cdot COOH \end{array} \end{array} \right.$$

Since remarkable amounts of ethyl alcohol have been produced from acetic acid along with fumaric acid by both the fumaric and lactic acid formers, it may be assumed that a simultaneous dehydrogenation is necessary for the condensation of these C_2-compounds to fumaric acid. It is not clear, however, why the lactic acid former does not produce fumaric acid from glucose, while it produces abundant quantities of ethyl alcohol from glucose as shown below.

The assumption that fumaric acid was derived from the substance of mycelium or from carbohydrates, which were previously synthesized from acetic acid, proves to have little evidence for support, since fumaric acid and not lactic acid was the only product from acetic acid by the lactic acid former.

(1) T. Takahashi and K. Sakaguchi: J. Agr. Chem. Soc (Japan), 1, 344 (1925).
(2) T. Takahashi and T. Asai: ibid., 3, 589 (1927).

On the Biochemical Properties of Diphtheria Toxin.

(pp. 23~24)

By Tetutaro TADOKORO and Tuneyuki SAITO.

(Hokkaido Imperial University; Received December 4, 1940.)

Studies on the Determination of Vitamin B_1 in Various Food Materials by the Thiochrome Method.

(pp. 25~36)

By Hisasi ARIYAMA, Ryusaku HOSINO and Yosisaburo NAKAZAWA.

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Received December 13, 1940.)

To make the thiochrome method applicable to the determination of vitamin B_1 in various food materials, the authors modified Jansen's original method in some respects, and obtained satisfactory results.

The modified procedure is as follows:

The food materials are extracted with water or 50% ethanol according to the kind and amount of extractive matters which will be extracted along with vitamin B_1 and the filtered solutions are evaporated to a proper concentration in vacuo. Then the solutions obtained, after being treated with ether, are incubated with a suitable amount of Kasiwagi diastase, a commercial diastase preparation, for 24 hours at 45°C. Then the solutions are agitated with the proper amount of purified acid clay and the acid clay is collected, washed and dried. (If necessary, the concentrated solutions are treated with absolute ethanol before agitation with acid clay.) The activated acid clay is treated as usually with potassium ferricyanide in alkaline solution and vitamin B_1 is converted to thiochrome. Vitamin B_1 value is obtained by matching the blue fluorescence, which the thiochrome solution in iso-buthanol produces in u. v. light, with the standard solution of pure vitamin B_1, using the ordinary Duboscq colorimeter. The results of determination on 16 kinds of cereals and cereal products, 9 kinds of vegetables, 12 kinds of fish and meat and 12 kinds of commercial vitamin B_1 preparations are presented. Furthermore, the authors made the determination of vitamin B_1 contained in three kinds of cooked diet and ascertained that as long as "Haiga-mai," rice so hulled as to retain embryo, was used as the staple food, the vitamin B_1 supply was enough to cover the daily requirement.

Chemical Researches on the Pulp Woods of Siam. Part I.

(pp. 37～46)

By Masuzo SHIKATA, Yoshitsugu KIMURA, Kozo NAKAMURA and Shinzo HACHINOE.

(Kyōto Imperial University; Received December 17, 1940.)

In this paper, the researches on the chemical components, fibre-length, and cooking experiments of hard woods of Siam are given.

The species of the woods employed are as follows:—

Samples	Siamese name	Botanical name
No. 1	Mai Sa	Broussonetia papyrifera
No. 2	Mai Kratoom Boke	Anthocephalus cadamba
No. 3	Mai Jang	Niebuhria Siamensis
No. 4	Mai Pormuen	Hibiscus sp.
No. 5	Mai Por Keegai	Grewia sp.
No. 6	Mai Makok	Spondias mangifera
No. 7	Mai Duae	Ficus spp.
No. 8	Mai Chanuan	Dalbergia sp.
No. 9	Mai Ngiu pa	Bombax spp.
No. 10	Mai Khoi	Streblus asper
No. 11	Mai Por e geng	Streculia sp.
No. 12	Mai Jun	Milletia sp.
No. 13	Mai Yompa	Ailanthus sp.

The data are given in Table I.

For cooking experiment Ca-sulphite process was adopted.

Table I. Experimental Data.

Species / Physical properties	No. 1 Mai Sa	No. 2 Mai Kratoom Boke	No. 3 Mai Jang	No. 4 Mai Pormuen	No. 5 Mai Por Keegai	No. 6 Mai Makok	No. 7 Mai Duae	No. 8 Mai Chanuon	No. 9 Mai Ngiu pa	No. 10 Mai Khoi	No. 11 Mai Pore geng	No. 12 Mai Jun	No 13 Mai Yompa
Annual rings	6	11	50	12	5	12	8	9	30	10	12	13	15
Diameter (cm)	9.5	27.5	23.5	7.9	9.5	27.2	22	18.5	26.4	24.5	13.0	23.0	25.2
Fibre-length (mm)	0.81	1.41	0.88	1.58	1.24	1.36	1.34	1.14	2.29	1.21	2.02	1.15	1.37
Volume weight	0 38	0.61	0.64	0.49	0.60	0.33	0.33	0.56	0.29	0.49	0.34	0.61	0.34
Species / Chemical Components													
Alcohol-benzene-soluble	0.98	4.06	0.54	0.33	1.32	1.65	1.15	1.15	0.92	2.28	2.05	2.18	1.63
Water-soluble	1.47	6.18	12.57	10.23	2.13	5.19	5.83	3.54	6.50	6.23	3.62	3.39	1.23
Hot-water soluble	2 65	6.94	14.80	11.11	2.32	6.12	7.99	4.08	10.97	10.07	6.56	5.83	3.23
1% NaOH soluble	16.77	13.79	24.59	20.08	13.90	24.70	18.52	12.73	26.8[illegible]	12.94	17.44	11.53	7.51
Crude cellulose	58.75	49.03	47.09	57.50	53.65	57.86	54.46	58.79	53.41	47.17	55 13	53.50	59.87
α-cellulose	45.58	36.68	35.20	40.56	43.74	43.38	41.24	47.08	36.32	31.87	45.74	34.78	37.41
β-cellulose	12.52	3.76	5.46	6.66	2.42	5.65	3.63	5.64	12.34	6.31	2.78	16.44	15.46
γ-cellulose	0.65	8.59	7.03	10.28	3.56	8.83	9.59	6.07	4.75	10.99	6.61	2.[illegible]8	7 00
Lignin	23.24	22.81	25.58	26.59	26.48	18.89	31.55	26.98	27.70	30 51	29.25	24.55	24 62
Pentosan	18.67	15.54	16.99	14.08	16.08	17.27	13.30	14.47	8.58	16.30	14.74	14.19	15.55

Galactan	1.41	0.63	13.43	8.70									
Hemi-cellulose	20.09	16.18	30.42	32.78									
Nitrogen	0.09	0.06	1 16	1.09									
Crude protein	0.56	0.38	7.23	6.83									
Ash	1.00	2.29	1.93	1.12	1.03	1.69	1.93	1.57	1.52	3.59	1.39	1.83	1.29
Methoxyl	5.79	7.38	5.39	6.19									
Methoxyl/Ligmin × 100	24.91	22.48	21.20	23.58									
Ca-Pectic acid	0.44	0.41	3.17	1.97									
In total cellulose: α-cellulose	77 58	74.81	73.44	72.35	88.85	74.98	75.73	80.08	68.00	64.82	82.97	65.01	62.49
In total cellulose: β-cellulose	21.14	7.67	11.68	11.59	4.51	9.76	6.66	9.59	23.10	12 83	5.07	30.73	25.82
In total cellulose: γ-cellulose	1.98	17.57	14.88	16.06	6.64	15.26	17.67	10.33	8.90	22.35	11.99	4.26	11.68
Species / Yield and Analysis of Unbleached Pulps													
Yield to chip	48.0	39.1		43.82	42.0	45.38	41.68	41.63	43.82	39.13	39.25	42.25	45.25
Yield to $1m^3$ wood (kg)	185.22	237.67		217.03	252.0	149.7	137.5	233.1	157.53	191.7	133.4	257.7	153.8
Total cellulose	96.94	92.63		93.30	93.85	95.62	85.66	87.06	96.09	89.42	89.14	82.91	92.16
α-cellulose	80.97	84.93		88.97	83.58	81.06	74.78	69.24	88.15	77.18	70.02	63.25	81.45
β-cellulose	11 44	6.37	Cooking impossible	2.52	6.95	8.91	10.26	10.44	5.21	11.31	16.61	17.41	5.72
γ-cellulose	4.53	8.70		6.81	3.32	5.65	0.62	1.38	2 73	0.93	2.51	2.25	4.99
Pentosan	8.6	6.27			3.36	3.85	5.75	4.52	3.46	6.75	6.89	1.94	4.75
Poe's number	1.85	6.06		0.95	0.85	1.22	6.62	2.24	6.13	3.00	4.43	2.73	1.51
Ash	0.38	0.31		0.67	1.12	1 30	2.61	2.43	0.73	0.12	1.20	1.95	0.51